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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/570,232

02/28/2006

Takakuni Ueno

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EXAMINER

ABRAHAM, AMJAD A

ART UNIT

PAPER NUMBER

1744

NOTIFICATION DATE

DELIVERY MODE

10/18/2010

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptomail@panitchlaw.com

Office Action Summary	Application No. 10/570,232	Applicant(s) UENO, TAKAKUNI	
	Examiner AMJAD ABRAHAM	Art Unit 1744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07/29/2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7-10 and 12-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,3,4,10,12,13,15,17 and 19 is/are allowed.
- 6) ☒ Claim(s) 5,7-9,14,16,18 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's remarks and amendments, filed on July 29, 2010, have been carefully considered. Claims 1, 5, 12-13, are currently amended by applicant. Claims 15-20 have been added as new claims. Thus, claims 1, 3-5, and 7-20 are now pending.

Applicant's arguments & amendment to the claims given full considerations & thus, rejection of Claims 1, 10 & 12 Under 102 (b) & 3-4 & 13 under 103(a) are hereby withdrawn

Allowable Subject Matter

1. Claims 1, 3-4, 10, 12-13, 15, 17, and 19 are allowed.
2. The following is a statement of reasons for the indication of allowable subject matter: Kihara (JP 03-281329) the closest prior art on record teaches a stereolithographic method which forms a 3-D object using a planar plotting mask which can be moved as well have the mask image changes simultaneously in order to form a 3D object in which there are no defect lines (boundary defect). Kihara does not expressly teach wherein the light intensity generated by the mask is continuously changed and equalized so that the resin layer that is cured is cured with the same intensity at all points which are projected by the mask. In addition, Kihara does not expressly state wherein adjacent overlapping of curved layers or staggering the position of the plotted light intensity will attenuate possible defects in adjacent plotted layers.

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3. [Why these claims are now in condition of allowance. These claims were rejected under 102(b) over Kihara &

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 5, 8, 14, 16, 18 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Kihara et al. (Japanese Patent Publication JP 03-281329—made of record by applicant and translated by USPTO certified translator).

3. Regarding claim 5, 16, 18, and 20, Kihara teaches an optical three-dimensional shaping apparatus. **(See claim 1 and figure 1).**

a. Kihara also teaches

i. A photocurable resin supply means. **(See figure 1 (part # 2) disclosing a liquid resin supply vessel. Also see page 5 line 9 disclosing that resin is typically supplied layer by layer.)**

ii. A light source. **(See figure 1 (part number 4))**

iii. A two axis exposure mask (planar plotting mask). **(See part number 3 of figure 1 disclosing a liquid shutter plate that serves as the optical mask.)**

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iv. Moving means for moving mask. **(See part numbers 8, 10, and 11 of figure 1 disclosing moving means for mask/shutter system. Also see page 7 lines 4-24 disclosing the use of a XY stage driver to move the mask and scan the surface of the light curing resin in a two-dimensional direction.)**

(1) The claim limitation, "moving means for continuously moving the planar plotting mask", is a means plus function limitation that invokes 35 U.S.C. 112 6th paragraph and the corresponding structure is seen in page 44 lines 3-24 of applicant's specification. The use of a motor in conjunction with a drive source and a guide system is disclosed as the means necessary to move the planar plotting mask.

v. Means for continuously changing the mask in synchronism with the movement of the mask. **(See part number 6 in figure 1 disclosing a liquid crystal shutter driver. See also page 9 lines 12-24 discloses the changing of a shutter system that is controlled by inputted shape data.)**

(2) The claim limitation, "means for continuously changing the mask image of the planar plotting mask in synchronism with movement of the planar plotting mask", is a means plus function limitation that invokes 35 U.S.C. 112 6th paragraph and the corresponding structure is seen in page 46 lines 12-25 of

applicant's specification. The use of a shutter system (liquid-crystal shutter or a digital micromirror shutter) in conjunction with stored data on a computer is disclosed as the means necessary to move the continuously change the mask.

vi. Wherein the planar plotting mask and the XY stage driver continuously changes the shape of the mask and the position of the mask in synchronism. **(See page 9 lines 17-18).**

vii. Wherein the build operation consists of overlapping adjacent plotted areas in order to make the boundary areas unnoticeable. **(See figures 2a -2f and page 8 lines 14-24).**

(3) *Figures 2a-2f shows the synchronism between the changing of the mask and the movement of the mask in an XY position. As the mask translates position in figures 2a-2f there are points of overlapping in adjacent areas.*

viii. Wherein computer controls the adjacent plotted areas to form a curved part. **(See figures 2a-2c showing the formation of a curved 3 dimensional object.)**

(4) As the operation for forming the curved object is started the overlaps are continually formed on the adjacent plotting areas and when forming a curved part of the adjacent plotting areas the overlaps must also be curved.

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b. With respect to the following claim limitations: It is examiner's position that the Apparatus disclosed by Kihara and Applicant are identical and can be operated in the same manner. A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) (The preamble of claim 1 recited that the apparatus was "for mixing flowing developer material" and the body of the claim recited "means for mixing ..., said mixing means being stationary and completely submerged in the developer material". The claim was rejected over a reference which taught all the structural limitations of the claim for the intended use of mixing flowing developer. However, the mixer was only partially submerged in the developer material. The Board held that the amount of submersion is immaterial to the structure of the mixer and thus the claim was properly rejected.). In this case, Kihara teaches a resin supply system, light source, planar plotting mask, and computer controlled changing of a mask. As applicant has not claimed any additional apparatus limitation which would control the method operations below, Kihara anticipates applicant's claims.

ix. (Claim 5) – making a total intensity of light radiated onto the overlaps between the adjacent plotted areas in the optically cured resin layer equal or analogous to the intensity of light radiated onto areas other than the overlaps.

x. (Claim 16) – the apparatus is configured to generate mask images with the computer to attenuate a visual noticeability of the overlaps among the adjacent plotted areas of optically-cured resin layers with a finally-obtained stereolithographic 3-D object by making a shape of the overlaps between the adjacent plotted areas in the optically cured resin layer curved, or by staggering positions of the overlaps between the adjacent plotted areas in the optically cured resin layer in vertically stacked optically cured resin layers.

xi. (Claim 18) - the apparatus is configured to make a shape of the overlaps between the adjacent plotted areas in the optically cured resin layer curved.

xii. (Claim 20) - the apparatus is configured to stagger positions of the overlaps between the adjacent plotted areas in the optically cured resin layer in vertically stacked optically cured resin layers.

4. Regarding 8, Kihara teaches the use of a liquid crystal shutter with the mask.

(See page 4 line 20).

5. Regarding claim 14, Kihara teaches wherein the adjacent areas are overlapped during the synchronized stereolithographic procedure to create a high resolution part.

(See figures 2a -2f and page 8 lines 14-24).

c. *Figures 2a-2f shows the synchronism between the changing of the mask and the movement of the mask in an XY position. As the mask translates position in figures 2a-2f there are points of overlapping in adjacent areas.*

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (Japanese Patent Publication JP 03-281329—made of record by applicant and translated by USPTO certified translator) in view of Smith (USP No. 6,500,378) in further view of Lercel (USP No. 6,461,797).

4. Regarding claim 7, the combination of Kihara and Smith does not teach wherein the planar plotting mask is a planar plotting mask in which a plurality of micro-optical shutters capable of blocking or allowing transmission of light into microdot areas are arranged in a planar manner.

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- a. Smith teaches the use of a Spatial Light Modulator which is typically used in conjunction with micro-optical shutters. **(See abstract).**
- b. However, Lercel teaches the use of a plurality of micro-mirror shutters to allow for selective exposure of light towards photosensitive or UV curable materials. **(Column 7 lines 30-67, Column 8 lines 16-30, Column 9 lines 18-20, and figure 8)**
- c. Kihara/Smith and Lercel are analogous art because they are from the same field of endeavor which is forming an object via lithography. At the time of the invention, it would have been obvious to one having the ordinary skill in the art, having the teachings of Kihara/Smith and Lercel before him or her, to modify the teachings of Kihara/Smith to include the teachings of Lercel for the benefit achieving increased light intensity control in order to incrementally alter light intensity in order to mesh the adjacent boundary layers together without a noticeable boundary.

<p>5. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kihara et al. (Japanese Patent Publication JP 03-281329—made of record by applicant and translated by USPTO certified translator) in view of Hennings (US Patent 3,718,396).</p>
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6. Regarding claim 9, Kihara does not teach wherein a light-condensing lens which is interposed between a light source and the planar plotting mask and can be continuously moved in synchronism with the planar plotting mask; and a projection lens which is interposed between the planar plotting mask and the surface of the

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photocurable resin composition and which can be continuously moved in synchronism with the planar plotting mask.

- d. However, Hennings teaches the use of a condensing lens followed by a mask, which is followed by a projection lens to project an image to a substrate.

(See figure 2)

- i. The art taught by Hennings shows that it is well known to have a lithography set up which utilizes a projection and condensing lens to alter the intensity of a light source. Therefore, it would have been obvious to one skilled in the art to use a lens setup of this nature in order to have a lithography apparatus with a high degree of intensity and illumination control.

Response to Arguments

6. Applicant's arguments filed July 29, 2010 have been fully considered but they are not persuasive.

7. **Applicant Argument:**

- d. Applicant seems to argue that the intensity control of the light source and planar plotting mask differentiate the apparatus claims from Kihara.

8. **Examiner Response:**

- e. It is examiner's position that the Apparatus disclosed by Kihara and Applicant are identical and can be operated in the same manner. A claim

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containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) (The preamble of claim 1 recited that the apparatus was "for mixing flowing developer material" and the body of the claim recited "means for mixing ..., said mixing means being stationary and completely submerged in the developer material". The claim was rejected over a reference which taught all the structural limitations of the claim for the intended use of mixing flowing developer. However, the mixer was only partially submerged in the developer material. The Board held that the amount of submersion is immaterial to the structure of the mixer and thus the claim was properly rejected.). In this case, Kihara teaches a resin supply system, light source, planar plotting mask, and computer controlled changing of a mask. As applicant has not claimed any additional apparatus limitation which would control the method operations below, Kihara anticipates applicant's claims.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

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TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to AMJAD ABRAHAM whose telephone number is (571)270-7058. The examiner can normally be reached on Monday through Friday 8:00 AM to 5:00 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yogendra Gupta can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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/Yogendra N Gupta/
Supervisory Patent Examiner, Art Unit 1791

AAA